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FILICES BRITANNICÆ;

AN

HISTORY

OF

BRITISH FERNS.

PART THE SECOND.

With PLAIN and ACCURATE DESCRIPTIONS,

AND

NEW FIGURES of all the SPECIES,

Taken from an immediate and careful Inſpection of the Plants in their Natural State, Drawn of their Natural Size, and accurately Engraved.

INCLUDING

An APPENDIX to the FORMER PART of this WORK,

By which the Whole is completed.

By JAMES BOLTON,
Member of the Nat. Hiſt. Society, EDINBURGH.

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M,DCC,XC.

INTRODUCTION

CONTINUED.

THE Genus of Plants called *Equiſetum*, or Horſetail, conſtituting a Part of the Order FILICES in the LINNÆAN SYSTEM, together with the two other Genera, the *Iſoetes* and *Pilularia*, are the ſubject of the preſent Sheets.

The Horſetails, of which no more than ſix ſpecies have been diſcovered in Great Britain (by that fondneſs for increaſing the number of Plants which almoſt Univerſally prevailed amongſt the Botaniſts of the laſt ages) have been inincreaſed to double their real number, by the Addition of imaginary *ſpecies*.

Dillenius, in the third Edition of *Ray's Synopſis*, enumerates twelve ſuppoſed ſpecies; ſix of which, that are varieties only, and not ſpecies, I will here endeavour to point out.

There is a variety of *Equiſetum ſylvaticum*, not unfrequently to be met with by Road-ſides and in Pathways, having the ſecond leaves all turned to one ſide of the firſt leaf or *ſtem*; this happens when the firſt leaf has been trod down, or by ſome Accident ſo bent or broken as to lie flat on the

Ground; all the ſecond leaves naturally riſe upward, but they iſſue from all ſides of the firſt leaf at the baſe of the *vagina*, in the declined, as well as in the erect Plant; the Plant in this ſtate makes the

Equiſetum ſylvaticum procumbens ſatis uno verſu diſpoſitis. Ray Syn. P. 131. *No.* 5.

There is a Variety of *Equiſetum arvenſe*, which grows in very wet ſoils in cloſe woods, amongſt tall graſs or under the umbrage of various other Plants, in which the leaves are very ſlender, and greatly drawn out in length; in which ſtate it makes the

Equiſetum pratenſis longiſſimis ſetis. Ray Syn. 131. *No.* 8.

The fertile ſhoots of *Equiſetum arvenſe* come up before the barren ones; theſe are deſtitute of ſecond leaves, they are variegated with brown colours, and ſoon periſh; in this ſtate they are the

Equiſetum nudum minus variegatum baſilienſe. Ray Syn. P. 130. *No.* 3.

There is a variety of the *Equiſetum paluſtre*, which grows in ſhady ſituations or under trees, about the borders of ponds and brooks, wherein both the firſt and ſecond leaves are very ſlender, and drawn out in length, much beyond their uſual ſtandard, and are frequently of a pale yellow-green colour; this is the

Equiſetum paluſtre tenuiſſimis longiſſimis ſetis. *Ray Syn. P.* 131. *No.* 6.-----*This through miſtake has been made a variety of Equiſetum Arvenſe.*

There is another variety of *Equiſetum paluſtre*, in which the branches or ſecond leaves are fertile, producing ſmall flower ſpikes on their ſummits. This variety, in moſt inſtances where I have had an opportunity of obſerving it, has been occaſioned by that the primary flower ſpikes, of ſuch ſhoots as produced ſecondary ones, had been bit off or otherwiſe deſtroyed; this variety is the

Equiſetum paluſtre minus polyſtachion. *Ray Syn. P.* 131. *No.* 7. *Tab.* 5. *Fig.* 3.

When the *Equiſetum limoſum* grows in the mud at the bottom of ſtill ponds or rivers, and is in a luxuriant ſtate, it commonly produces plenty of branches or ſecond leaves; in which ſtate it makes the

Equiſetum foliis nudum ramoſum. *Ray Syn.* 132. *No.* 12.

There is a variety of *Equiſetum hyemale*, in which the leaves are ruſh-like, quite ſimple, and deſtitute of branches; in this ſtate it makes the

Equiſetum foliis nudum non ramoſum ſue junceum. *Ray Syn.* 131. *No.* 11.

The

The manner in which the ſeeds of the Horſetails are diſcharged is beautiful, and well deſerves our regard. The laborious and ingenuous Hedwig has well illuſtrated this particular, by a number of figures, in his *Theoria Pl. Crypt. Tab.* 1, 2. And I have found the truth of his Obſervations by examining the ſame ſubjects, under the firſt magnifier of Cuff's Compound Microſcope, as now ſold by *Nairn* and *Blount*, in London; my figures, however, vary a little from thoſe of Hedwig.

In the annexed Plate, A, is a ſingle ſhield ſeparated from the flower ſpike, and magnified with its curved ſupport, and its ſix ſeminal valves unopened. Theſe valves open by a longitudinal ſuture from top to bottom, on the inner ſide, and copiouſly diſcharge a ſoft downy powder, which when newly fallen or ſhook out may, through a moderate ſpy-glaſs, be ſeen to ſkip and leap about as if alive; after the diſcharge of this powder the ſeminal valves or capſules remain for ſome time in an horizontal direction, empty and dry, as is expreſſed at B; where the underſide of the ſhield and the inſide of the valves are repreſented.

The ſeparate ſeed-veſſels, if ſuch we may call them, conſiſt of an oval placenta, and four ſpoon-ſhaped filaments or ſtraps; to theſe laſt the ſeeds immediately adhere. While

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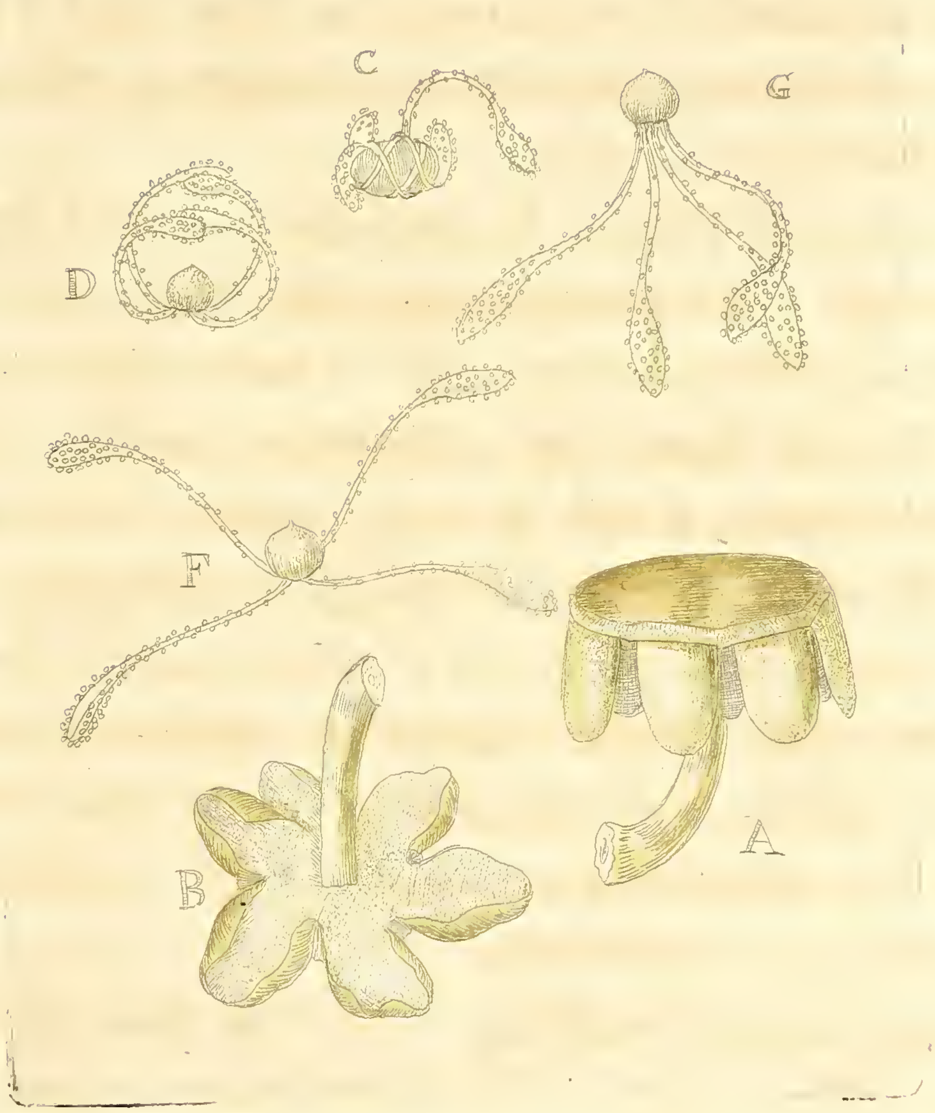


BRITISH MUSEUM NATURAL HISTORY

theſe ſeed-veſſels are included in the ſeminal valves, the ſtraps are rolled round the placenta, in two oppoſite ſpiral directions, as is expreſſed at C, where they are beginning to unroll; at D, they are repreſented as farther diſengaged; at F, they are quite expanded; and at G, the elaſtic force of the filaments being quite exhauſted, they are at reſt. This unrolling of the ſtraps or filaments, however, is not gradual, as I have repreſented it, but performed in an inſtant, by a ſudden jerk; by which the ſeeds are thrown off with force, and committed to the air, where they float innumerable. *What is their uſe?* Certainly they are produced for other purpoſes beſides the propagation of the ſpecies; every perfect ſeed ſpike produces millions of theſe, and yet the plant is propogated by the root; nay, ſo rarely do the ſeeds anſwer the purpoſe of propogation, in this family, that I could never yet diſcover a ſeedling plant of any one of the ſpecies.

The ſame obſervation holds good, in reſpect to all the other Ferns, and to the Fungi; the multitude of ſeeds produced by an Agaric or a Boletus, is innumerable! is aſtoniſhing! yet not one of ten thouſand anſwers the purpoſe of propogation. Is not the Air we breathe charged with them all the declining part of the year? Do we not receive them into our Lungs with every breath we draw? Whence proceed the Quinſies,

Quinſies, Coughs, and other complaints, which prevail in Autumn?

I am not here to inquire into their noxious or ſalutary effects, when received into our Lungs; yet it cannot ſurely be amiſs, to drop this ſhort hint to thoſe whoſe province it is to make ſuch inquiries.

Stannary, near *Halifax*,
October 16, 1790.

FILICES BRITANNICÆ.

PART THE SECOND.

EQUISETUM.

Lin. Gen. Plan. 1169.

EQUISETUM ſylvaticum.

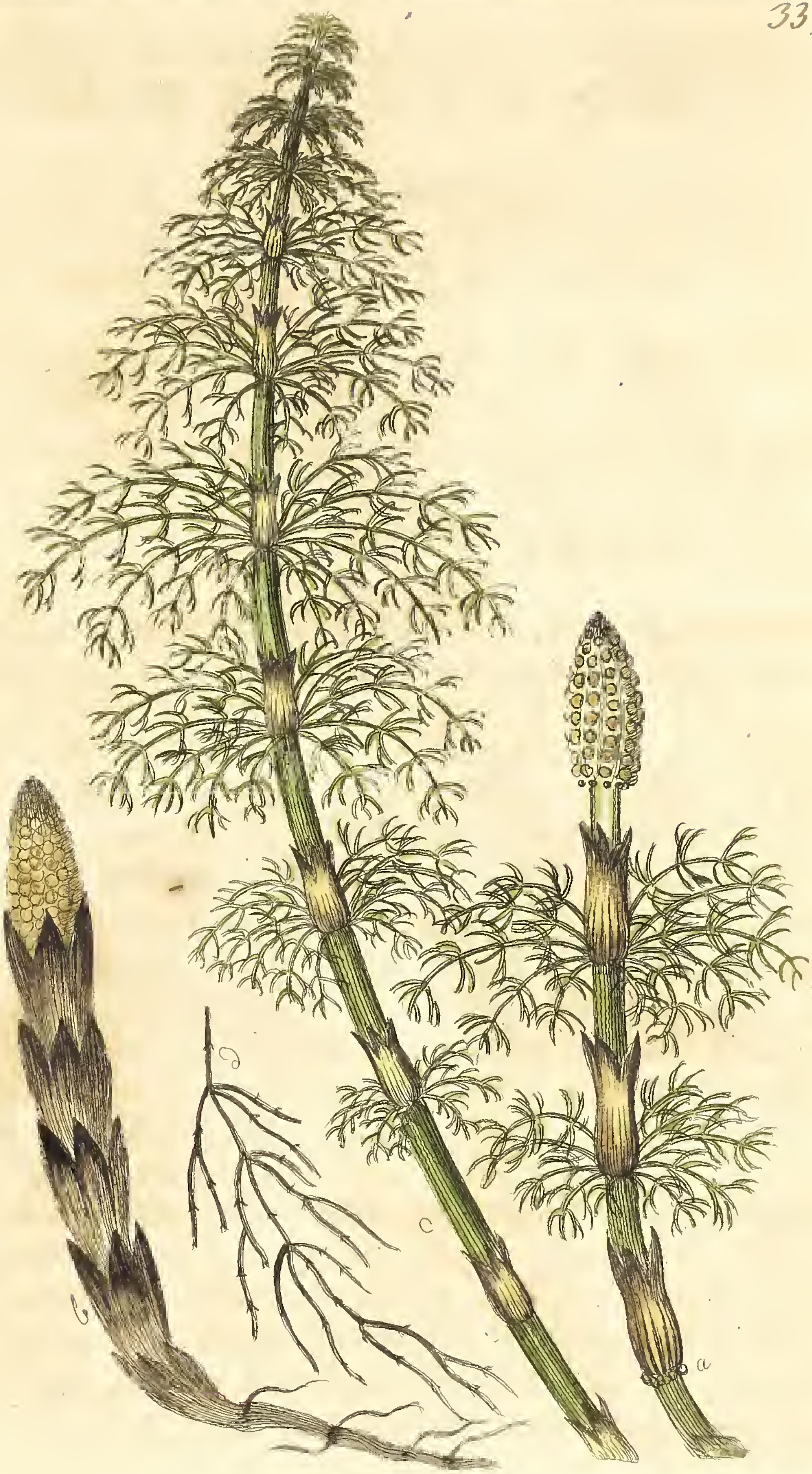
Lin. Sp. Pl. 1516. *Flo. Ang.* 447. *Scot.* 664. *Cant.* 383. *Ray Syn.* 131. *Ger. Em.* 1114. *Park.* 1201.

TAB. *XXXIII.*

WOOD HORSETAIL.

FROM a brown, jointed, fibrous, tough, creeping root, the fertile ſhoots begin to appear about the end of March, or beginning of April. Theſe ſhoots at their firſt appearance are of a dark ruſty-brown colour on the outſide, which is compoſed of ſeveral vaginæ, of a thin filmy ſubſtance, and lie over one another in an imbricated order; each ſeparate vagina is divided in three or four dents at the rim, and marked with about twelve ſtriæ at the baſe, as at b. From the uppermoſt of theſe vaginæ the flower ſpike appears; it is of an oval or oblong figure, conſiſts of numerous hexangular ſhields, cloſe thruſt together, their upper or naked part of a pale brown colour, and a ſmooth ſurface. As it advances in growth, theſe ſhields ſeparate, and the ſeminal valves under each ſhield are librated, and diſcharge the ſeeds in form of a ſoft, downy, bluiſh powder. By this time the ſtem has attained the height of eight or ten inches; it is of a ſmooth ſurface, and a pale-green colour. The ſecond leaves make their firſt appearance like little teeth, in a circle, round the baſe of the uppermoſt vagina, as expreſſed in the Plate at a; where I have ſhewn them at the baſe of the third vagina. When this firſt circle has made ſome progreſs in growth, another circle begins to appear in like manner, at the baſe of the ſecond vagina, and thus proceeds downwards, as is expreſſed in the ſhoot a, *Tab.* 34.

The


d
b
c
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NATURAL HI

The ſecond leaves are jointed, and have vaginæ at the joints; from the baſe of which vaginæ the third leaves are produced, three or four from each joint.

Theſe third leaves, like the firſt and ſecond, are jointed and vaginated; and, in ſome luxuriant ſpecimens, I have ſeen fourth leaves of a ſimilar ſtructure.

BARREN LEAVES, *Fig.* c.

Theſe ſpring from different parts of the ſame root, which produces the fertile ones, and like thoſe are at firſt wholly covered with vaginæ, but are readily diſtinguiſhed from them, by being much ſmaller, and of a pale, duſky, green colour.

From the uppermoſt vagina, the rudiments of the ſecond leaves make their firſt appearance, in form of a cloſe, rough, pale-green, tapering ſpike.

The vaginæ are green, except at the point, where they are divided in four brown dents, as in the fertile ſhoots; but in this they are ſmaller, and embrace the ſtem more cloſely than in that.

The ſecond leaves are about twelve in number, produced in circles from the baſe of the vaginæ, each having a proper, brown, ſhort, tridentate vagina, at its baſe; they are quadrangular, jointed, and have quadridentate vaginæ, from the baſe whereof grow the third leaves, three or four at a joint, and are of the ſame ſtructure with the ſecond. A full grown ſecond leaf is ſeen in the Plate, at d.

It grows in wet, ſandy ſoils, in woods and meadows about *Halifax*, abundantly.

EQUISETUM arvenſe.

Lin. Sp. Pl 1516. *Flo. Angl.* 447. *Scot.* 647. *Cant.* 344. *Ray Syn.* 130. *Ger. Em.* 1114. *Park.* 1202.

TAB. XXXIV.

CORN HORSETAIL.

THE root is of a dark brown or blackiſh colour, jointed at equal diſtances, emits numerous black fibres from the joints, and creeps to a great diſtance under the ſurface.

The fertile ſhoots at *a*, make their appearance about the end of March; the flowering ſpike being at firſt hidden under the brown imbricated vagina; when the ſpike firſt appears it is of a greeniſh colour, afterwards changes to brown, and when at maturity the valves open, and diſcharge a pale coloured downy powder, which is the ſeed.

The ſtem is round, ſmooth, hollow, and of a pale pleaſant brown, it conſiſts of ſeven or eight joints, each ſurrounded by the baſe of a fuſcous vagina, which is a little inflated, and divided at the top in about twelve narrow, pointed, brown ſegments. This ſtem very rarely produces any ſecond leaves; it generally falls and diſappears before the appearance of the barren leaves.

BARREN LEAVES.

The barren leaves, b, appear in April, and grow from the ſame roots as the fertile ones; at their firſt coming up the ſecond leaves are hidden under the vagina, but ſoon make their appearance in about twelve ſhort whirls, and form the reſemblance of a rough ſpike. When full grown it is about two feet high from the root to the top, and conſiſts of fifteen or twenty

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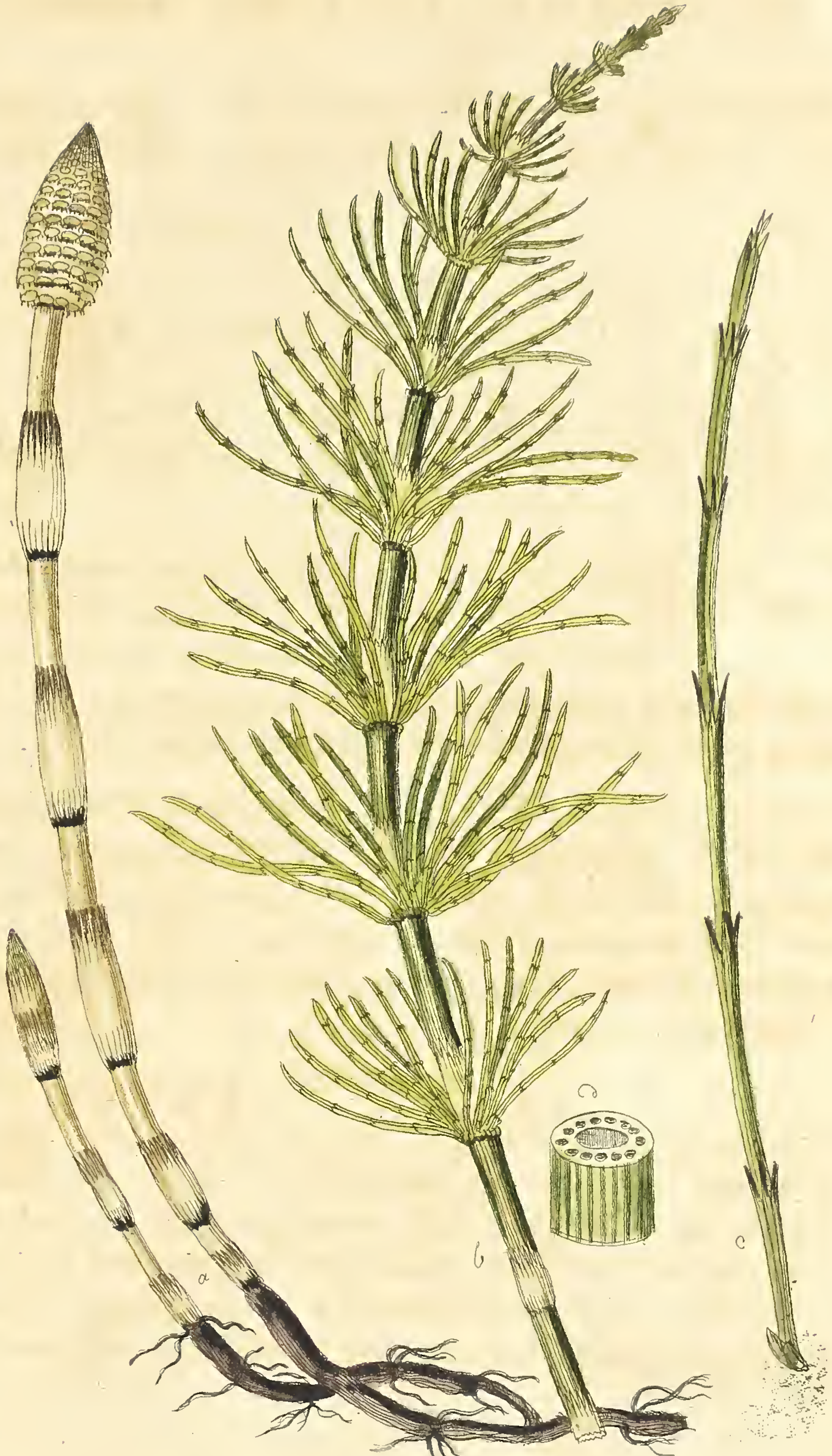


BRITISH MUSEUM
NATURAL HISTORY

twenty joints; five or ſix of which joints are deſtitute of ſecond leaves, but are, as well as the reſt, ſurrounded each with a vagina, not inflated as in the fertile ſhoot, but cloſely embracing the ſtem; they are of a pale-green colour, and each is divided in about twelve black acute points at the margin.

The ſecond leaves grow from the baſe of the vaginæ, at the joints of the firſt leaf; each has a pale-coloured, pellucid, quadridentate, proper vagina, at its baſe; each conſiſts of eight or ten joints, quadrangular, with quadridentate vaginæ at each joint. In the ſpecimen before me, the firſt leaf conſiſts of ſixteen joints, five of which, from the root, produce no ſecond leaves; at the ſixth the leaves are ſhorter than at the ſeventh, and grow gradually a little longer upwards to the tenth, from whence they diminiſh to the top, where they are ſhorteſt.

The barren leaves in this plant ſo nearly reſemble thoſe of the Equiſetum paluſtre, in ſome ſtages, that they are not eaſily diſtinguiſhed at firſt ſight; but may at all times be known by this remark, That the ſecond leaves in the arvenſe are quadrangular, and the vaginæ quadridentate; but in the paluſtre they are pentangular and quinquidentate.

The fertile ſhoots of this ſpecies cannot be diſtinguiſhed from thoſe of the Equiſetum ſylvaticum, before the ſecond leaves appear, except by the number of laſcinæ into which the vaginæ are divided, in the firſt being twelve, in the laſt three or four.

It grows in ſhady moiſt places about woods and rivulets, and flowers in April.

EQUISETUM paluſtre.

Sp. Pl. 1516. *Flo. Angl.* 448. *Scot.* 648. *Cant.* 384. *Ray Syn.* 131. *Tab.* 5. *Fig.* 3. *Var.* b. *Ger. Em.* 1113. *Park.* 1202.

TAB. XXXV.

MARSH HORSETAIL.

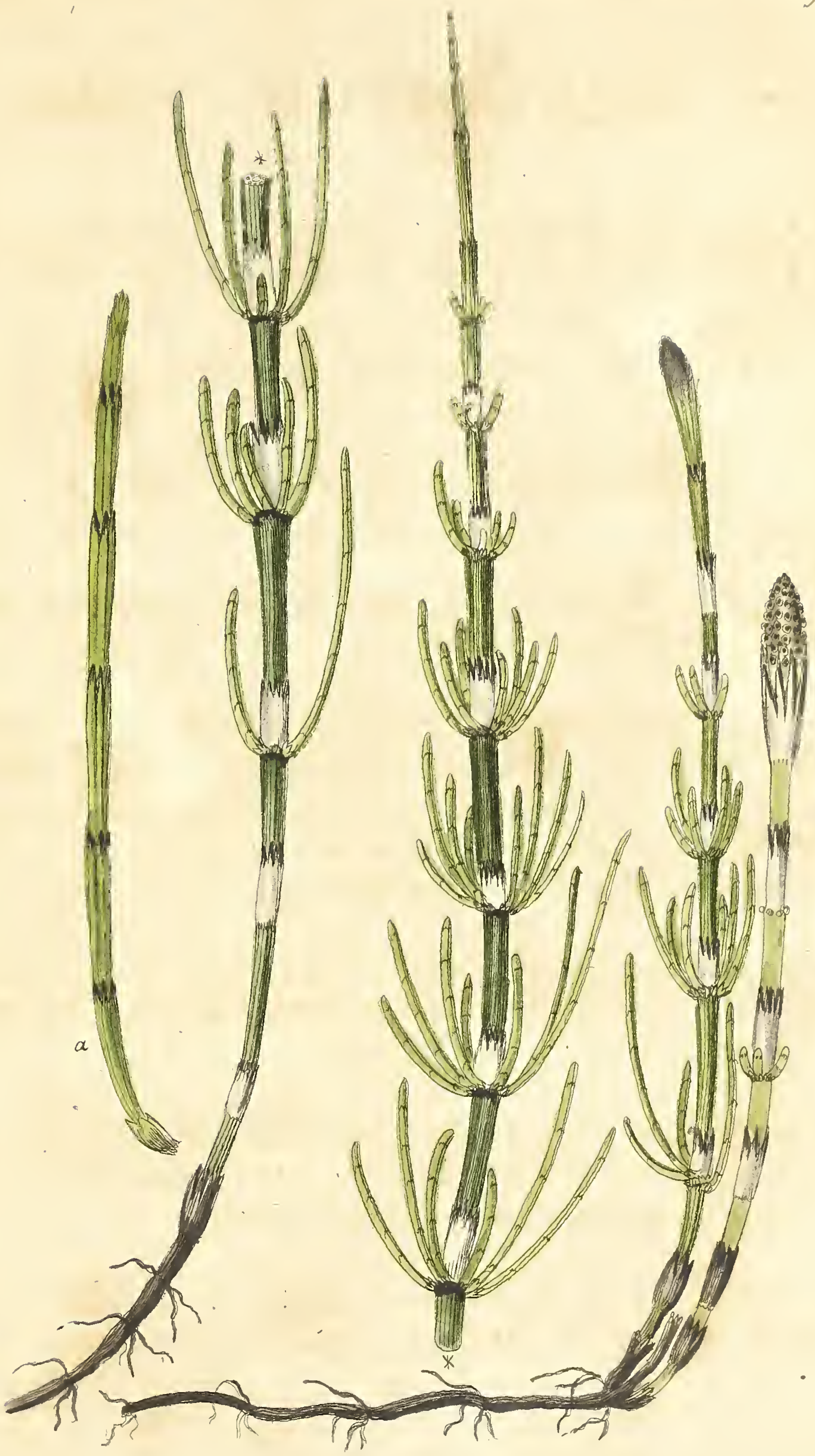
THE root is ſlender, black, jointed, and creeping; emitting black hard fibres from the joints.

The fertile ſhoots are ſlender, and of a freſh green; they are eight or ten inches high, and conſiſt of ſeven or eight joints, ſurrounded with vaginæ; two or three of the loweſt of which are wholly black, the others green, except the top, which terminates in ſeven or eight black acute dents, with white filmy margins.

The uppermoſt vagina, which is placed immediately under the ſpike, is longer than any of the reſt, and is divided in very long, ſlender, black dents.

The flower ſpikes are ſmaller than in any of the other ſpecies, black at firſt, but pale-coloured when full grown; the ſeminal valves being white, and diſcharging a pale-coloured powder.

The firſt leaves produce ſecond leaves at the baſe of the vaginæ, which grow erect, each having a proper black vagina at its baſe; they are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BRITISH MUSEUM

BRITISH MUSEUM

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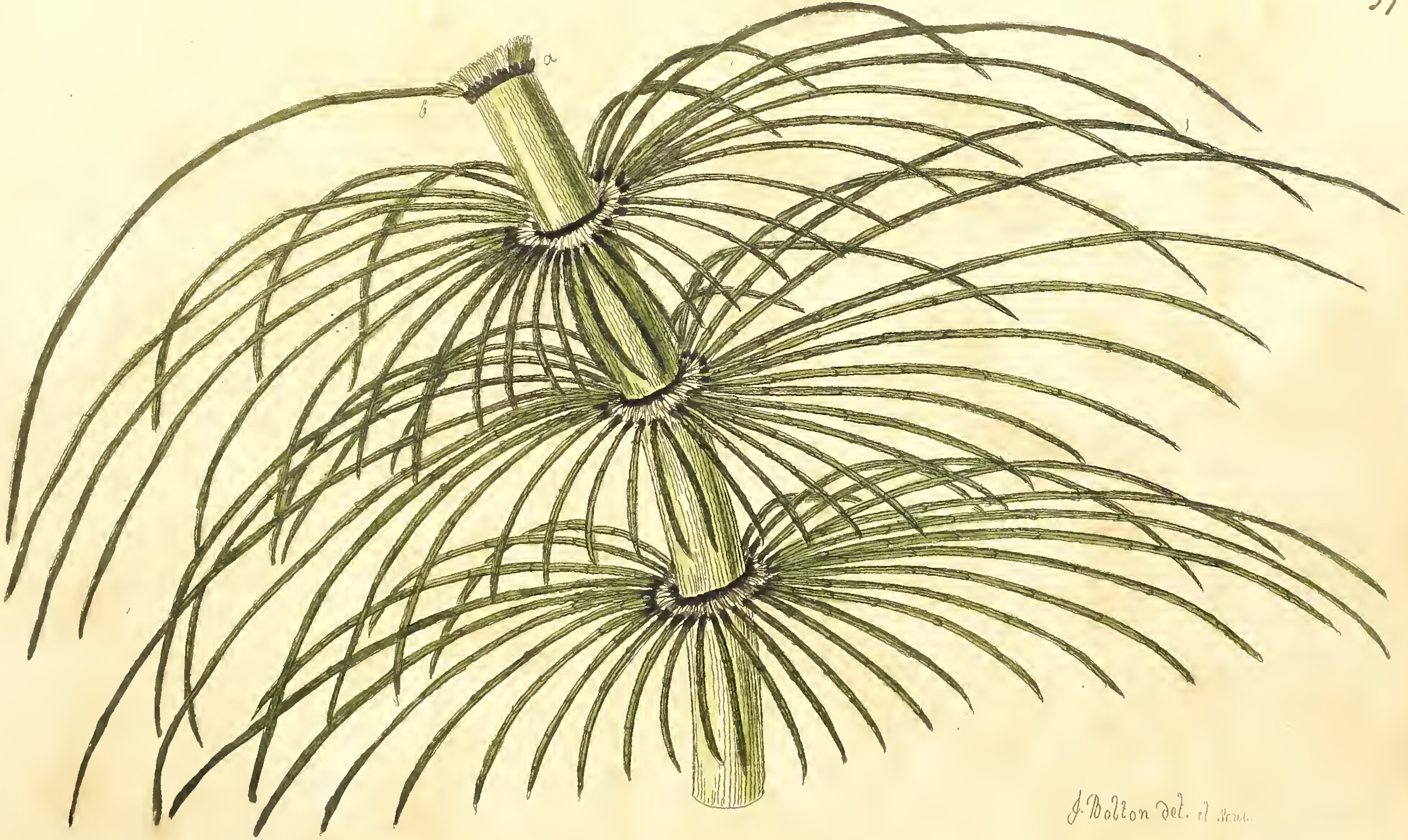


J. Bolton del. et Sculp.

are unequal in length, conſiſting of an uncertain number of pentangular joints, with quinquidentate black vaginæ at each joint.

BARREN LEAVES,

Theſe grow from the ſame root with the fertile ones, and reſemble them in ſubſtance and colour, but are taller and conſiſt of more numerous joints; in a full grown plant, twenty or more; and the ſecond leaves are alſo longer and more numerous. One of the ſecond leaves is a little magnified at a.

It grows in marſhy places, about brooks and woods. On the banks of the canal below *Mear-Clough-Bottom*, near *Halifax*, plentifully, along with the two former ſpecies; it flowers in May.

It is diſtinguiſhed from the Equiſetum limoſum, by being a leſſer plant, by its ſmall black root, by having fewer dents in the vagina, and in that the firſt leaves always produce ſecondary ones about the joints; but in the limoſum they are frequently naked.

Sometimes the ſecondary leaves are fertile, producing ſmall flower ſpikes on their ſummits, as figured by Dillenius, in Ray's Synopſis, *Pl.* 5. *Fig.* 3.

I have ſeen the ſecondary leaves fertile, but never, except in inſtances where the primary flower ſpike had been bit, or accidentally broken off.

EQUISETUM fluviatile.

Sp. Pl. 1517. *Flo. Ang.* 448. *Scot.* 649. *Cant.* 385. *Ray Syn.* 130. *Hall. Hiſt.* 1675. *Ger. Em.* 1113. *Park.* 1290.

TAB. XXXVI. XXXVII.

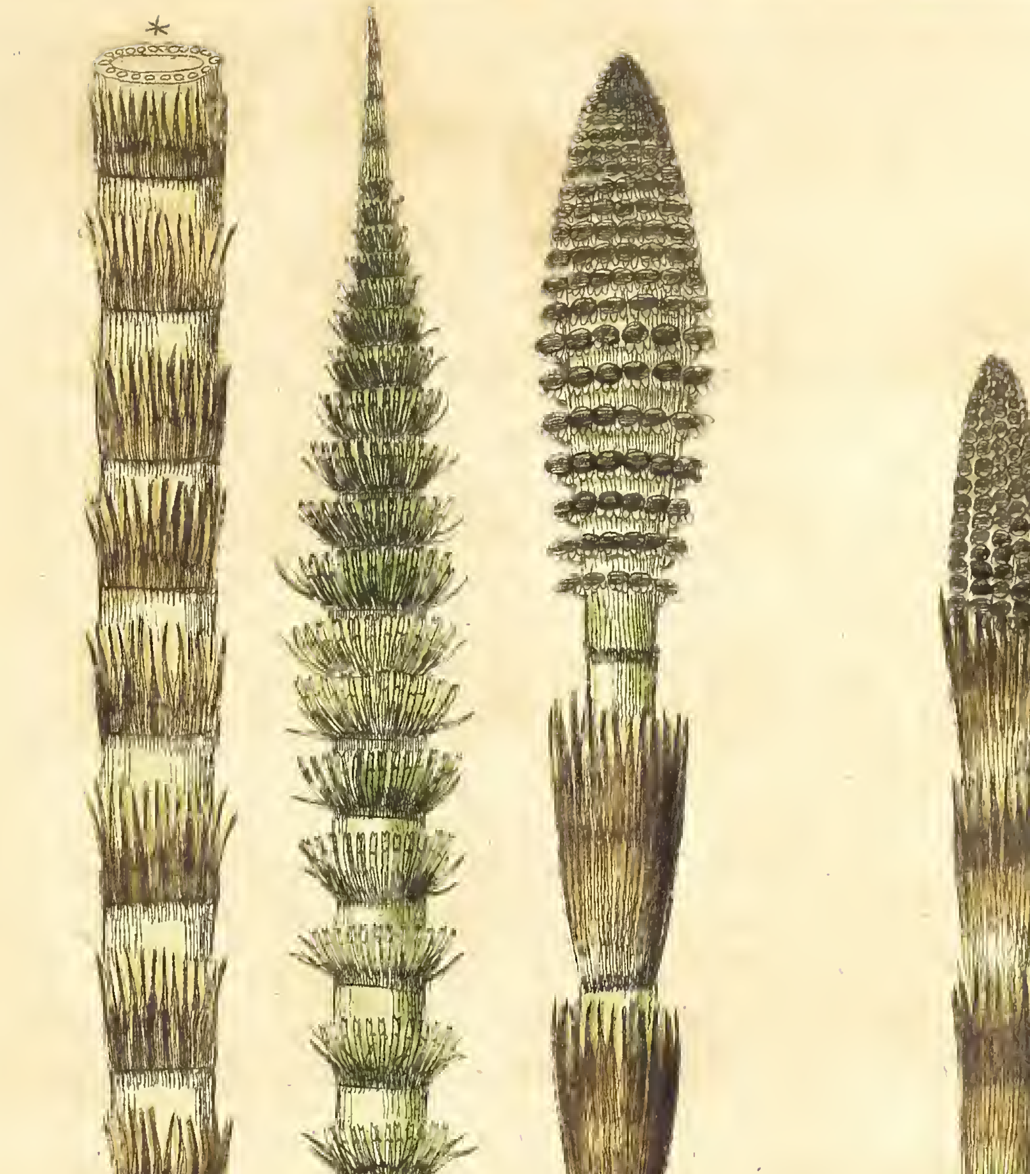
RIVER HORSETAIL.

FROM a jointed, black, fibrous, creeping root, as in the other ſpecies, the fertile ſhoots, a. make their appearance in April; they are at firſt ſurrounded by large, rough, huſky, imbricated, brown vaginæ; each divided in about twenty-four long, narrow, pointed, ruſt-coloured ſegments; from the uppermoſt of theſe the flower ſpike is produced.

The ſhields at firſt are ſmooth, cloſely compacted together, and of a brown colour.

The ſpikes, when full grown, are three inches long, and of a proportionable thickneſs; the ſeminal valves are white, and when the ſpike is in full blow it makes an elegant appearance.

The fertile ſtems, A, grow about a foot high, and conſiſt of eight or nine vaginated joints, but produce no ſecond leaves.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BARREN LEAVES.

The barren leaves, *Tab.* 36, B. and *Tab.* 37, are entirely covered by the vaginæ, till they attain the height of ten or twelve inches; in this ſtate they are of a mixed brown and green colour, terminating in an acute point at top, and, by the numerous diviſions of the vaginæ, ſeem as if ſurrounded with a rough, hairy, or briſtly covering.

From the joints, towards the top of the ſtem, the ſecond leaves firſt make their appearance in cloſe circles round the baſe of each vagina, as *Fig.* B. *Tab.* 26. Each circle is ſurrounded at its baſe by the brown laſcinæ of the vagina next below it.

The ſecond leaves when full grown, *Tab.* 37, are quadrangular, five or ſix inches long, and grow about thirty in a circle; each conſiſts of ſeven or eight joints, with black vaginæ, and having a proper brown vagina, ſupported by a black ſcale at its baſe. b, the proper vagina. a, the black ſcale, *Tab.* 37.

The barren leaves, in a proper ſoil, riſe to the height of five or ſix feet, and when freſh and full grown are very elegant. The figure, *Tab.* 37, repreſents four joints of the firſt leaf, with three circles of ſecond leaves, and, I think, gives a better idea of the plant, than could have been conveyed by giving a whole figure, ſo much reduced in ſize, as to bring it into the compaſs of my plate.

Grows in marſhy places, and about the borders of rivers. The ſpecimens from which I took the figures, were ſent me, in a freſh ſtate, by my obliging friend Mr. Edward Robſon, of *Darlington*, in the county of *Durham*.

EQUISETUM limoſum.

Sp. Pl. 1517. *Flo. Ang.* 448. *Scot.* 648. *Cant.* 385. *Ray Syn.* 131. *Tab.* 5. *Fig.* 2. *Hall. Hiſt.* 1677.

TAB. XXXVIII.

SMOOTH HORSETAIL.

THE root, A, is large, tough, branched, jointed, and vaginated; it is of a ruſty brown colour, and creeps horizontally under the mud.

The young ſhoots appear in April, and are covered with brown ruſt-coloured vagina; each of which is divided in twelve or fourteen black acute dents, at the top. The ſpaces between the vaginæ are of a pale green, and ſmooth ſurface.

In the full grown plant, the vaginæ change to a pale green, retaining only a faint tinge of brown near the baſe of the dents, which ſtill remain black. The uppermoſt vagina of the fertile leaf is paler, more large, more lax, and the black dents longer than in the reſt; and the ſtem above it, which ſupports the flower ſpike, is white.

The ſhields, which compoſe the flower ſpike, are at firſt black, and cloſe thruſt together; when the ſpike opens, the ſeminal valves are of a pale colour, and copiouſly diſcharge a white powder.

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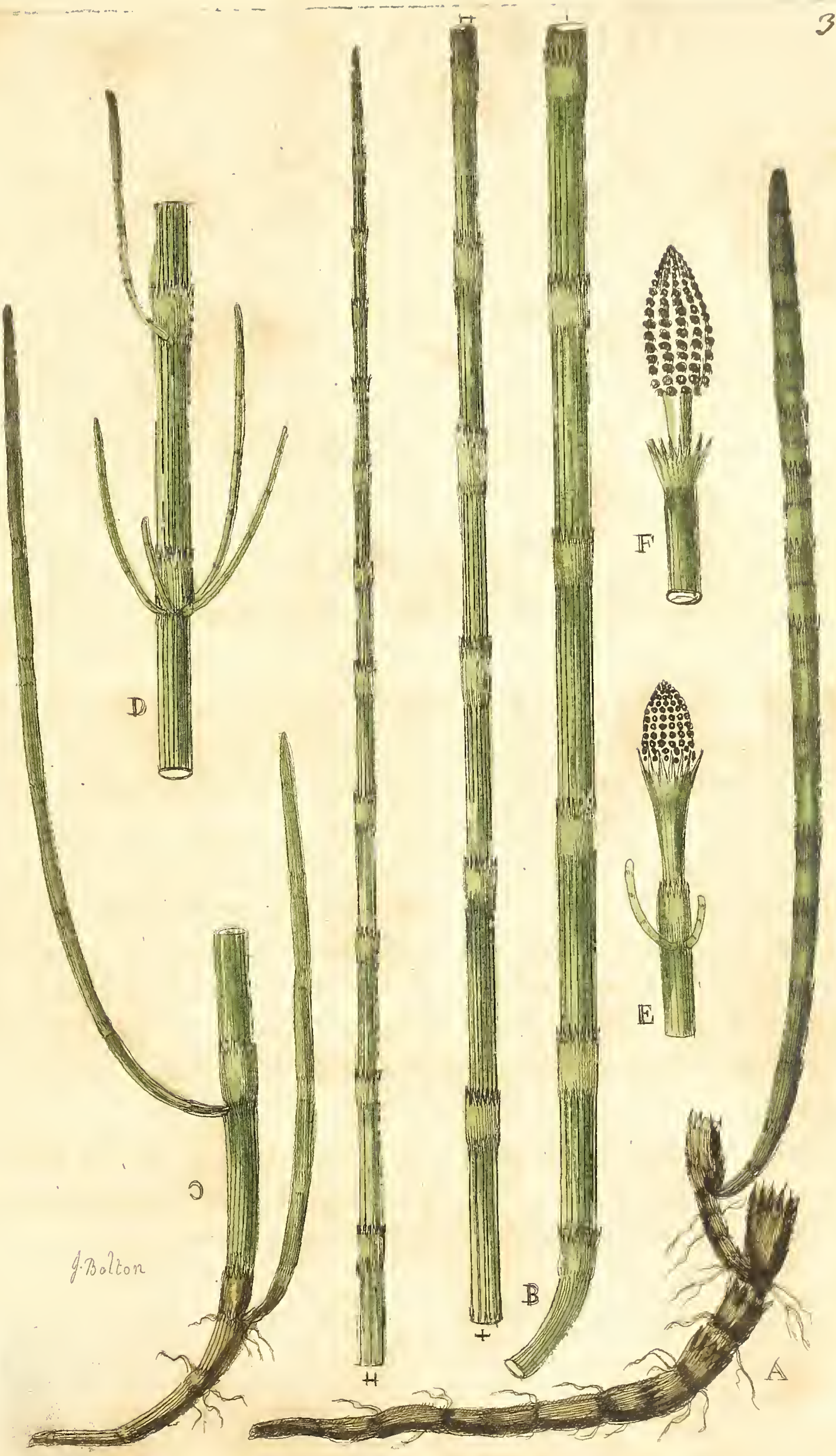
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J. Bolton

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NATURAL HISTORY

The fertile leaves conſiſt of fewer joints than the barren, and ſometimes produce a few ſecond leaves at the baſe of the vaginæ.

BARREN LEAVES,

The barren leaf which is cut into three parts, in the plate, *Fig.* B, riſes from the ſame root as the fertile leaf, and conſiſts, when full grown, of twenty-ſix or thirty joints, riſes to the height of three feet or more, is of a freſh green colour, and ſmooth ſurface, while young; when dry, becomes channelled, with twelve or fourteen furrows. The joints are cloſely embraced by the vaginæ, while the plant is freſh; when dry, the ſtem is contracted, the vaginæ are lax, and ſpread out at the margin.

The firſt leaves are moſt commonly ſimple and naked, as at B; but ſometimes one or two branches riſe from the lower joints, as at C; which branches are of the ſame ſtructure as the firſt leaf or principal ſtem.

The firſt leaves alſo ſometimes produce proper ſecond leaves, D, from the baſe of the upper vaginæ; two or three of theſe at a joint, ſometimes, though rarely, ſix or ſeven; they are unequal in length, jointed, pentangular, and the joints ſurrounded with a black quinquidentate vagina.

Grows in ſhallow ponds and ſtanding waters; and flowers in May.

EQUISETUM hyemale.

Sp. Pl. 1517. *Flo. Angl.* 448. *Scot.* 650. *Cant.* 385. *Ray Syn.* 131. *Hall. Hiſt.* 1679. *Ger. Em.* 1113. *Park.* 1207.

TAB. XXXIX.

ROUGH HORSETAIL.

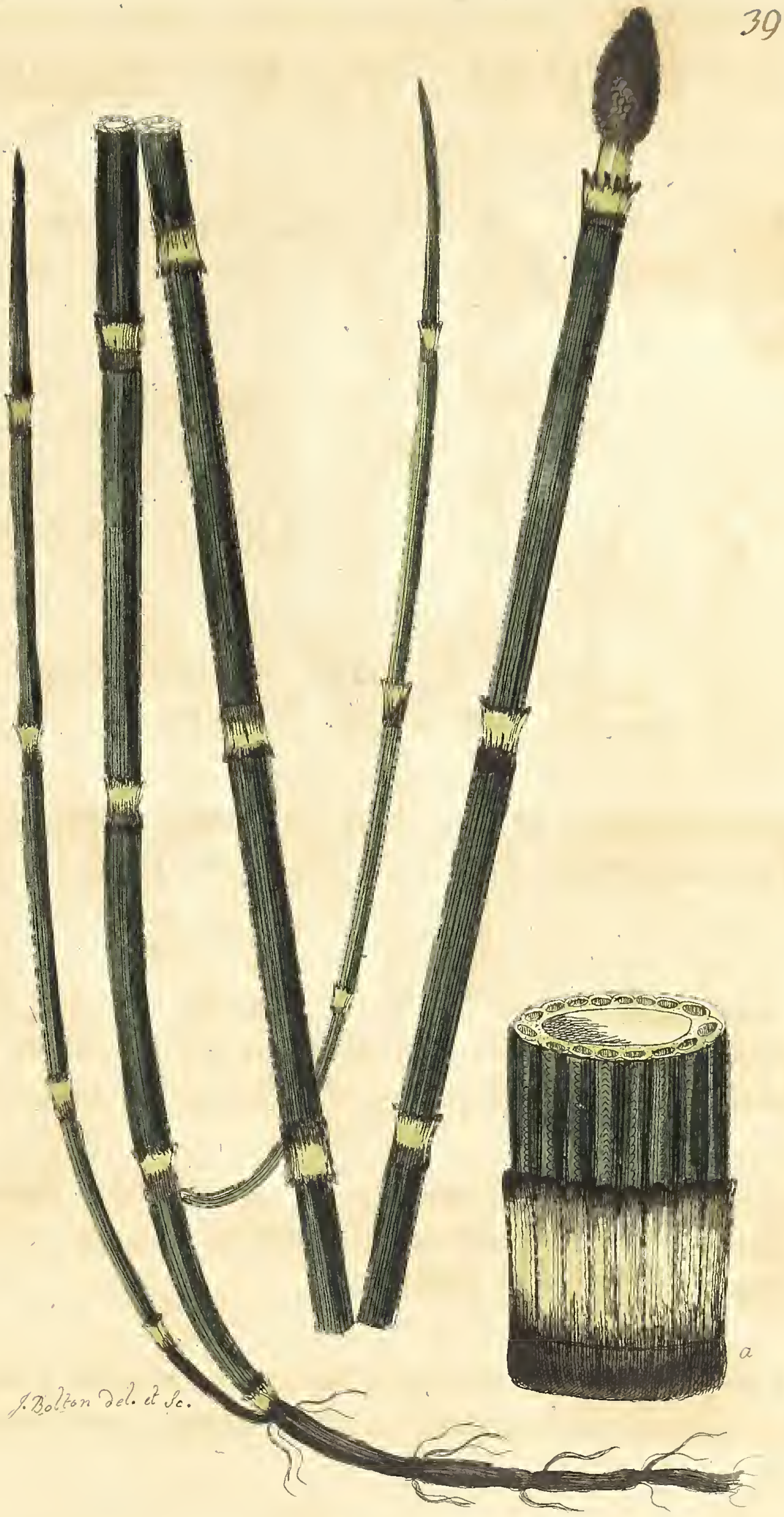
THE root is black, hard, tough, jointed, creeping, and emitting black, tough, hard fibres from the joints.

The fertile ſhoots, at their firſt appearance, are clubbed at the top, by reaſon of the flower ſpike, which is wrapped up in the uppermoſt vagina.

This uppermoſt vagina is divided, at the margin, in twelve or fourteen pointed dents or ſegments; whereas all the other vaginæ terminate in very ſhort, blunt, black dents.

The ſhields, in the flower ſpike, are cloſely thruſt together, and black at firſt; when the flowers are blown, the ſeminal valves are white, and diſcharge a bluiſh ſoft powder.

The full grown ſtem is about twenty-four inches high, conſiſting of nine or ten joints, the remoteſt of them about three inches aſunder; and each



J. Bolton del. et sc.

BRITISH MUSEUM
NATURAL

each ſurrounded with a ſhort lax vagina, black at the baſe and margin, but of a pale green in the middle.

The ſpaces between the joints are of a ſtrong bluiſh green, channelled with twelve or ſixteen furrows, and having alternate ridges, which are armed with hard, ſhort, rough ſpines, regularly placed in one line, along each ridge, as is expreſſed at b; where a vagina, a, and part of the ſtem are magnified.

The ſtem, as in the other ſpecies, conſiſts of a number of fiſtular tubes, which are bound together by an external and internal bark, and form one general fiſtular tube. In this ſpecies the inner bark is ſmooth and white.

The barren leaves in this ſpecies are not to be diſtinguiſhed from the fertile in any thing, but the want of fructification, and in their upper extremities terminating in a fine point.

Both the one and the other are moſt commonly ſimple, but ſometimes emit one or two branches from the lower joints, as is expreſſed in the plate. Theſe are of the ſame figure and ſtructure as the primary leaves, only ſmaller, and conſiſting of fewer joints.

This ſpecies is diſtinguiſhed by the ſhort obtuſe dents of the vaginæ, by the remoteneſs of the joints, by the roughneſs of the touch, and by being an evergreen.

The only places where I have ſeen it grow, are amongſt the buſhes cloſe by the brook at the lower end of the *Helk*, near *Ingleton*; and in a field, belonging to an eſtate called *Upper Brier*, in *Northowram*, near *Halifax*.

PILULARIA.

Lin. Gen. Plan. 1183.

PILULARIA globulifera.

Sp. Pl. 1653. *Flo. Ang.* 462. *Scot.* 682. *Ray Syn.* 130. *Vail. Paris. Tab.* 15. *Fig.* 6. *Dill. Muſc. Tab.* 79, *Fig.* 1. *Flo. Dan. Tab.* 223.

TAB. XL.

PEPPER GRASS.

WHAT has been called the root in this plant, may perhaps not improperly be termed the firſt leaf, or main ſtem of the plant. It creeps on the ſurface of the ground, in various winding directions, is of a browniſh-green colour, having knots or joints at diſtances.

At each knot of the creeping ſtem, the roots, conſiſting of three or four ſtrong white fibres, run down into the moiſt ſand, among which it grows; and at the ſame knots or joints, on the upper ſide of the ſtem, the ſecond leaves are produced, two or three together. While young they are coiled up in a cloſe curl, like moſt other of the ferns; when full grown they are about three inches long of a freſh green colour; each one

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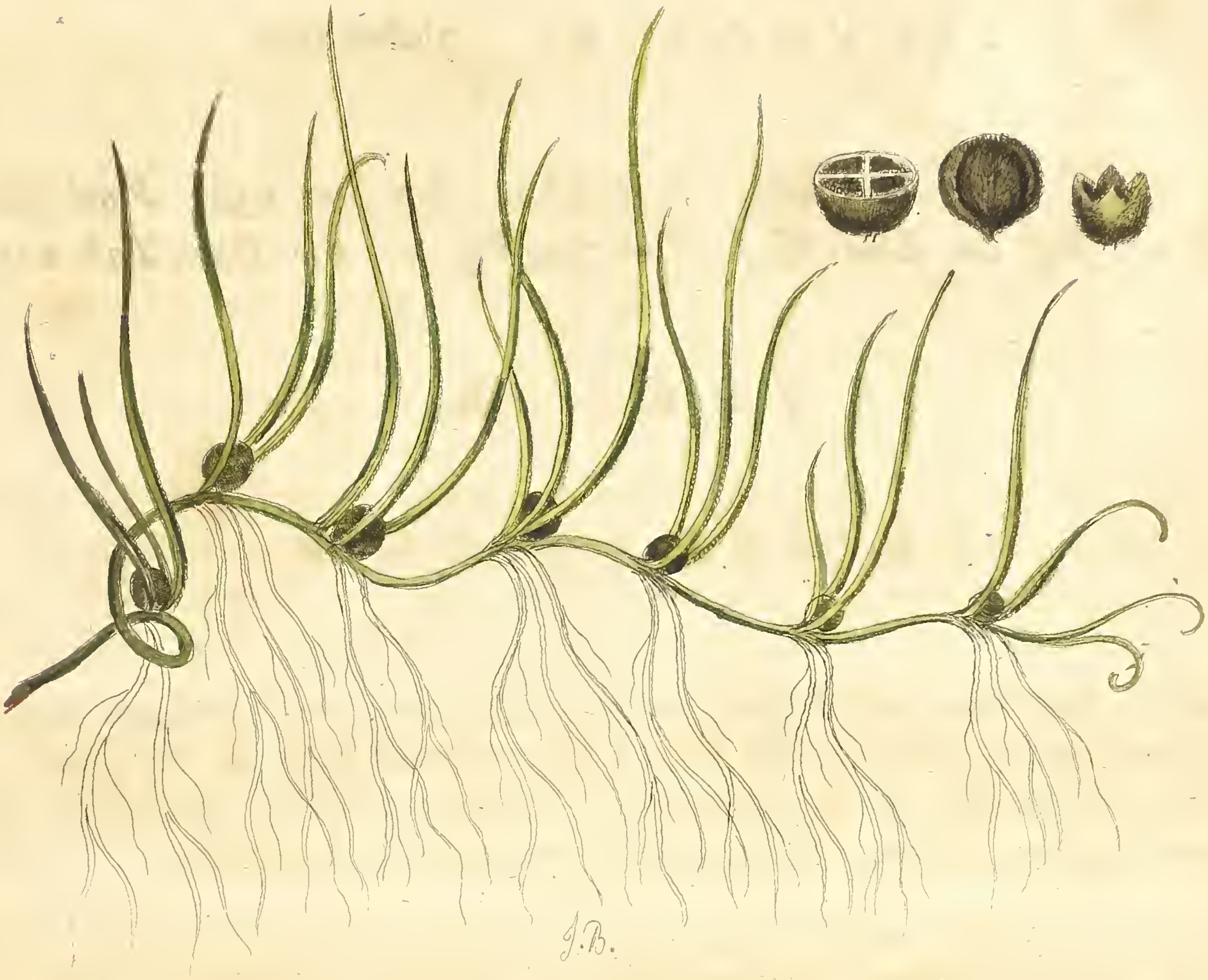

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one having a brown, duſky, granulated line, on the inner ſide; which is the male flower.

On the creeping ſtem, in the centre of theſe tufts of leaves, the ſeed-veſſels are produced; they are about the ſize of a pepper-corn, and of the ſame figure; at firſt green; when at full growth of a brown colour, and covered with a ſhort hairy ſhaggineſs; they are divided into four cells, and filled with ſmall, brown, globular ſeeds. When the plant dries it changes to a browniſh colour.

Grows in wet ſands, in places ſometimes overflowed with freſh water. It grows in ſeveral parts of *Wales*, and, as is ſaid, on *Honſlow-Heath*; and is in perfection in July.

ISOETIS.

Lin. Gen Plan. 1184.

ISOETIS lacuſtris.

Sp. Pl. 1563. *Flo. Angl.* 462. *Scot.* 683. *Dan.* 191. *Ray Syn.* 306. *Dill. Muſc. Tab.* 80. *Fig.* 2.

TAB. XLI.

QUILL WORT.

THE root conſiſts of numerous ſtrong, white, round fibres, which are connected together under the baſe of the leaves, and deſcend deep into the mud, at the bottom of lakes.

The leaves grow eight or ten from the ſame root, are four or five inches long, flat or plain on the inſide, round or gibous on the outſide; each conſiſts of ſeveral fiſtular tubes, ſlender, and imbedded in a ſoft ſpongy ſubſtance. Theſe tubes are furniſhed with ſmall diafragms, at certain diſtances, and are ſurrounded with one common, ſmooth, pale-green cover; and thus the leaf is conſtructed. When newly taken out of the water, it is pellucid; and, if viewed between the eye and the light

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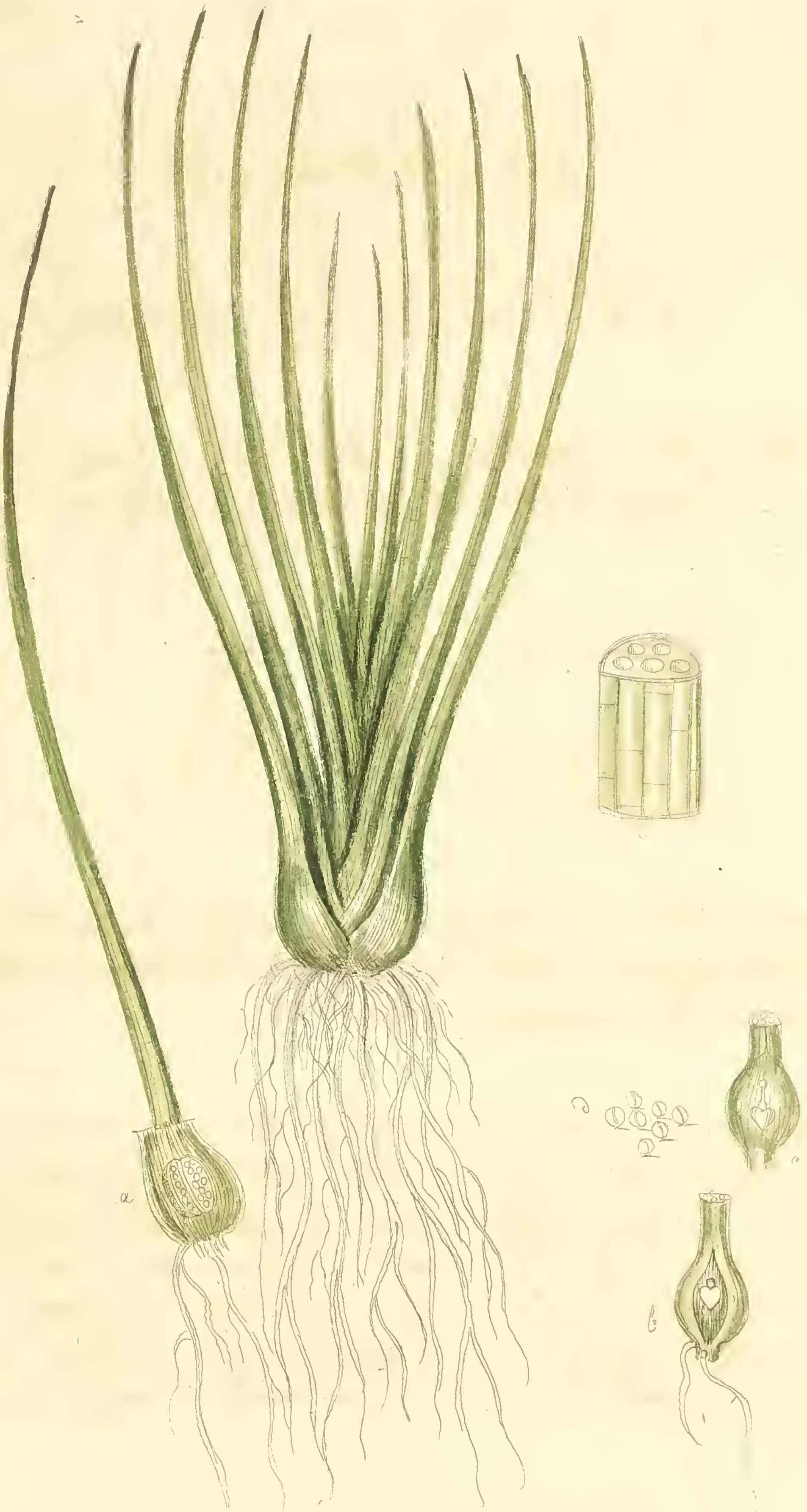


BRITISH MUS

light, the diafragms, in the internal ſmall tubes, may be eaſily diſcerned.

The outer leaves are greatly ſwollen and dilated at the baſe, as at a, b, c; where the fructification is lodged. The ſtile and ſtigma are placed in the hollow part of the baſe of the outer leaves; the germin is ſupported by a cordate valve, or flower-cup, as at e; and the edges of the inflated baſe, of theſe outer or female leaves, is a thin fine membrane, which ſo cloſely embraces and ſurrounds the gibous part of the male leaf within as to exclude the water.

The inner or male leaf, b, opens on the outer or gibous ſide of the baſe, within the embraces of the female leaf. Its fructification conſiſts of a roundiſh anthera, without filament; and it reſts on a cordate valve or flower-cup, ſimilar to that of the female. By the above admirable contrivance, the two flowers come in near contact with each other, and, though in the bottom of deep lakes, are ſecured from the intruſion of the water.

The ſeed-veſſel is of an oblong form, conſiſting of two valves, filled with white globular ſeeds; each of which is girt round with a prominent ring, as at d. After the diſcharge of the ſeeds, the outer leaves fall off and periſh, and the next in order perform the ſame office a ſucceeding year; and the number of leaves is kept up by a ſupply of young ones from the centre.

Grows in lakes on high mountains. I have dragged it out of ſeveral lakes on *Snowden*, and it has been ſent me from *Weſtmoreland*.

AN APPENDIX TO THE FIRST PART of this HISTORY of FERNS.

ACROSTICHUM. Part I. Page 21.

ACROSTICHUM alpinum.

Frondibus ſubbipinnatis, pinnis remotis ſubalternis, lobis rotundis ſubcrenatis ſubtus hirſutus, ſtipite lœvi. Pluk. Phyt. Tab. 89. *Fig.* 5. *Barrelier Icon.* 432. *Fig.* 2.

TAB. XLII.

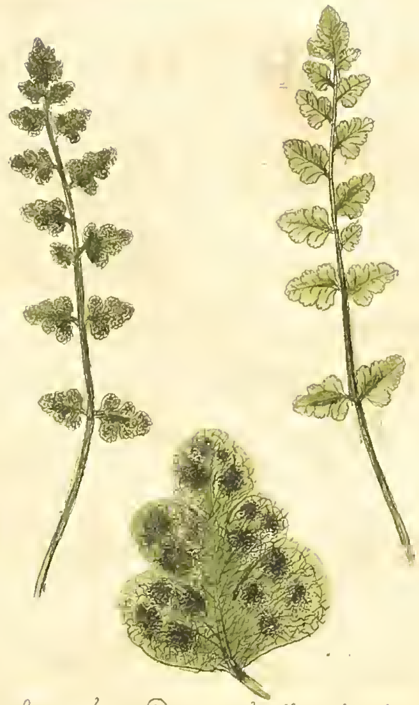
ALPINE ACROSTICHUM.

THE root of this little Acroſtichum conſiſts of a few black, hard branches, connected to a ſmall head, and furniſhed with black, hard, capillary fibres.

The rib of the firſt leaf, when full grown, is about three inches high, of a pale, browniſh-green colour, ſlender and ſmooth, being quite deſtitute of hairs.

Second leaves, ſix or ſeven pairs, oppoſite below, alternate above, of a triangular figure, obtuſe at the corners; three or four of the loweſt pairs being all of equal ſize, and remote; two or three of the upper gradually leſſening, and growing cloſer together.

42



Strictly copied from the Plant. by James Bolton

BRITISH MUSEUM
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Lobes of the ſecond leaves moſt commonly five; two on each ſide of the rib, and one at the end; they are of a roundiſh figure, grow cloſe together, and are obſcurely crenated round the margin. The colour on the upper ſide is a browniſh kind of green; the underſide thickly covered with a brown hairy nap.

The lower figure repreſents one of the ſecond leaves, as it appeared when a little magnified; the ſeed veſſels are diſpoſed in three or four cluſters, on each lobe, partly hidden amongſt numerous, ſtrong, brown, hair-like filaments, by which alſo the whole under ſide of the leaf, quite to the margin, is thickly covered.

The ſpecimen above deſcribed is very exactly figured on plate 42, and is a plant ſo perfectly diſtinct from the Acroſtichum ilvenſe, in its uſual ſtate, that it ſeems to me unreaſonable to ſuppoſe them both of the ſame ſpecies.

The Acroſtichum ilvenſe, deſcribed in the former part of this work, page 14, and accurately figured on plate 9, was brought from *Snowden*. *Oeder*, in *Flora Danica*, has given an excellent figure of the ſame plant, *Tab.* 391. And the figure in *Pluk. Phyt. Tab.* 179, *Fig.* 4, (which is cited by Linnæus, in *Flo. Suecica*, *Ed.* 2. *No.* 938,) agrees pretty aptly with both *Oeder*'s and my own: But are all very different from the Acroſtichum alpinum above deſcribed.

The ſpecimen figured on plate 42, was brought from *Scotland*, but the plant is alſo a native of *South-Britain*; for in a volume of dried plants, collected by the late Mr. T. Knowlton, I have ſeen ſpecimens of the ſame plant, with this note, in his own hand writing, *From the Mountains of Wales*. From theſe, and ſome other circumſtances, I am induced to think, that two ſpecies of Britiſh Ferns have been confounded together, under the name of Acroſtichum ilvenſe; and I believe that future obſervation will confirm the truth now diſcovered.

ACROSTICHUM thelypteris.

Sp. Pl. 1528. *Flo. Suecica. Ed.* 2. 928. *Lobel. Icon.* 814. *Filix querna repens. Park.* 1041.

TAB. XLIII. XLIV.

LADIES ACROSTICHUM.

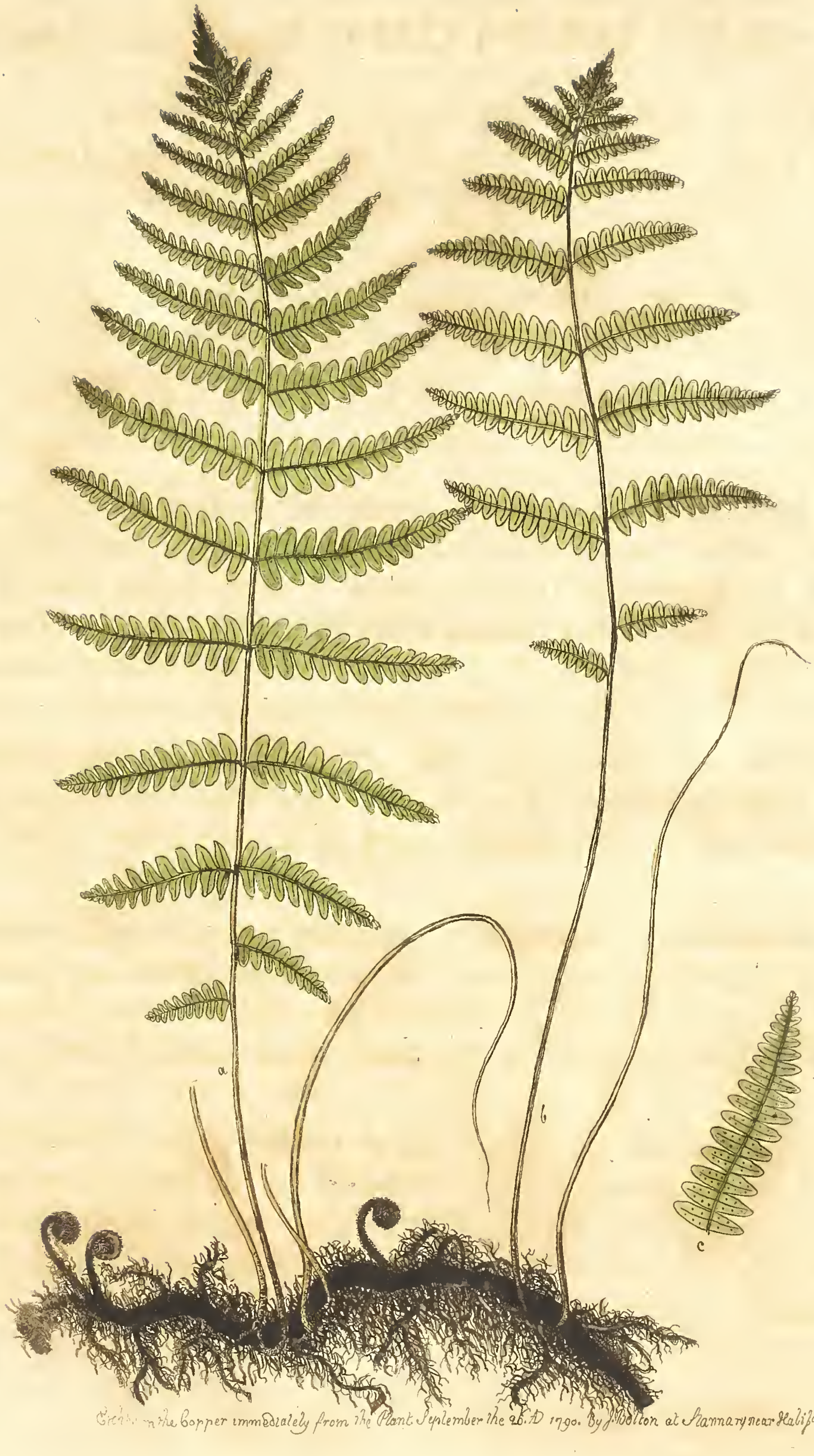
THE root creeps horizontally under the ſurface of the ground, is of a black colour and brittle ſubſtance, crooked, and about the thickneſs of a duck's quill; it emits many branches, the ſize of ſmall packthread, which are hung round with numerous, dark brown, capillary fibres.

From the root, as it creep along, the firſt leaves riſe at diſtances, two or three near together. The rib is from nine to fifteen inches high, ſmooth and naked, very ſlender, and of a pale herby colour.

The ſecond leaves from ten to fifteen pairs, oppoſite, except one or two of the loweſt pairs; lower pairs remote, growing gradually cloſer upwards, longeſt about the middle pair, all of them lance-ſhaped, and placed nearly at right angles wit thhe rib of the firſt leaf.

Lobes of the ſecond leaves ten or twelve pairs, divided down to the nerve; they are broad, ſhort, rounded off at the extremity, and quite ſmooth and entire on the edges; their upper ſurface ſmooth and plain, not obviouſly marked with veins, as in the Polypodium thelypteris; this circumſtance, together with its creeping root, and its being a much ſmaller

43



Etch'd on the Copper immediately from the Plant September the 26. A.D 1790. By J. Bolton at Stannary near Halifax.

BRITISH MUSEUM

ſmaller plant, are ſufficient at all times to diſtinguiſh it from that; though a reſemblance in habit and external appearance has cauſed the two ſpecies to be confounded together. This, however, could not have happened, had a ſtrict regard been had to the fructification in both.

In the Polypodium thelypteris, the ſeed-veſſels are arranged in cloſe regular lines, along the margin of the lobes; at firſt of a pale colour, changing brown in the progreſs; and, after the diſcharge of the ſeeds, ſpread out in breadth ſo as to occupy the whole diſk, except the middle only; this, however, is not always the caſe, for in ſome ſpecimens the lines remain diſtinct and ſeparate to the laſt; and in thoſe moſt effectually covered, the diſpoſition and arrangement of the ſeed-veſſels, in marginal lines, remain viſible.

But in the ſpecimen of Acroſtichum thelypteris now before me, which is in a middle ſtate of growth, and is accurately figured, *Tab.* 43, *Fig.* a, ſome of the ſeed-veſſels are viſible, as is expreſſed at *Fig.* c; they are ſmall, white, and placed irregularly on each ſide of the nerve; ſome are further advanced in growth than others; and the whole diſk, when a little magnified, appears beſet with ſmall tubercles, under which other ſeed-veſſels, yet in embrio, are lodged.

In the full grown plant, of which two ſecond leaves are figured, *Tab.* 44, on *Plate* 45, the whole under ſide, except the margin only, is cloſely covered with ſmall ſeed-veſſels, and they originate in every part of the diſk, as in the genus Acroſtichum, not in regular lines or rows, as in Polypodium. *Fig.* a. in *Tab.* 44, is a ſingle lobe magnified.

The barren leaves, *Fig.* b, were in a ſtate of half growth in the ſpecimens I examined; after the decay and fall of the ſecond leaves, the rib of the firſt leaf turns brown, and abides on the root over winter.

POLYPODIUM. Part I. Page 32.

POLYPODIUM rhœticum.

Sp. Pl. 1552. *Ray Syn.* 124. *Pluk. Phyt. Tab.* 89. *Fig.* 4.

TAB. XLV.

RHETIAN POLYPODY.

THE root of this plant, I have not had an opportuny of obſerving.

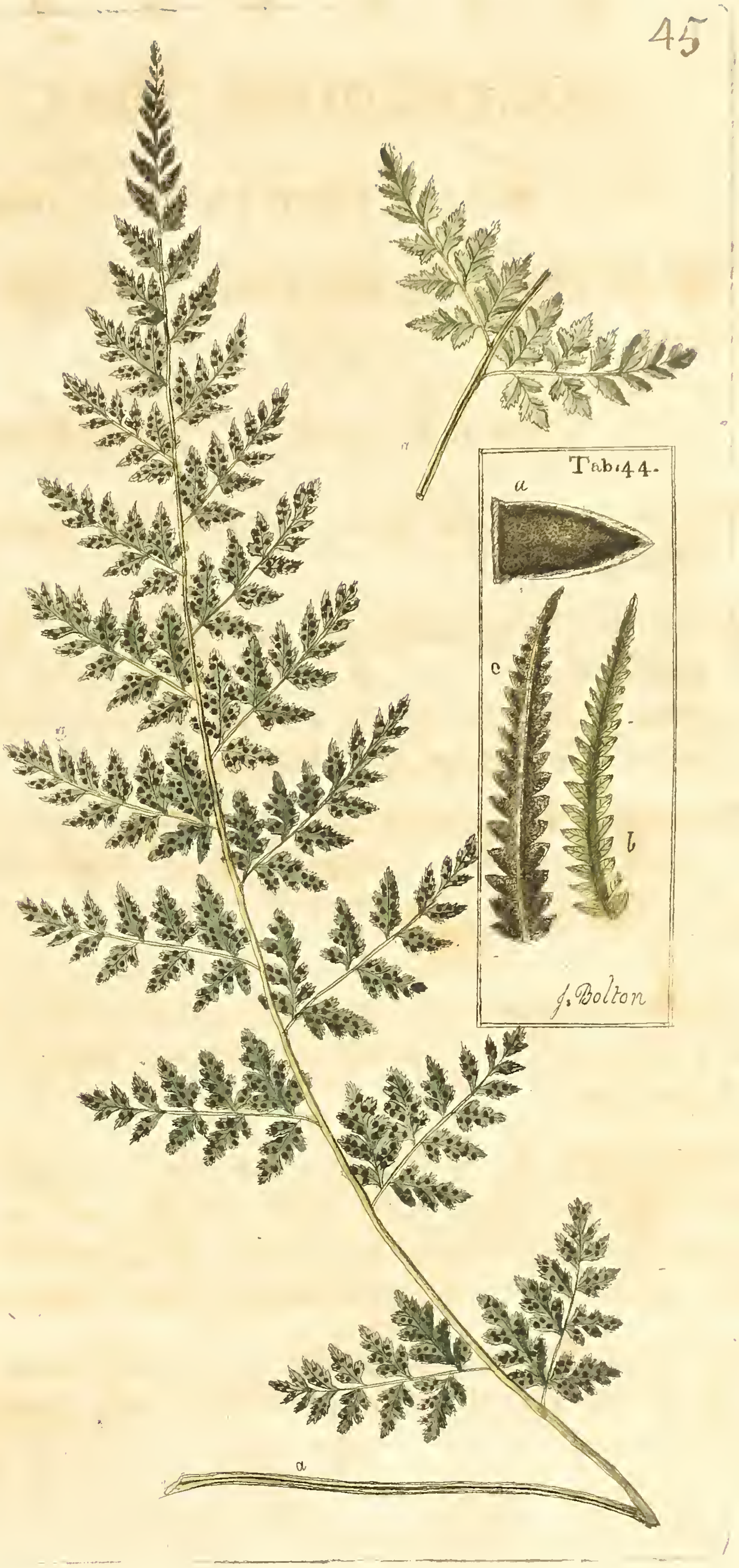
In the ſpecimen before me, the height of the *frons*, or firſt leaf, is about twelve inches; the rib is of a pale colour, furrowed on the upper ſide, covex or rounded on the under; is more ſtout, and much leſs brittle than that of the Polypodium fragile.

The ſecond leaves are about twelve pairs, placed alternately, very remote below, growing gradually nearer each other upwards, but are diſtinct quite to the top; they are placed at an acute angle with the middle rib.

The third leaves are divided, down to the nerve, into about three pairs of diſtinct lobes, of an oval figure, ſharply and diſtinctly ſerrated about the edges.

Thoſe third leaves which grow on the upper ſide of the rib of the ſecond leaf, are larger than thoſe which grow on the lower; by which character alone the ſpecies is at once diſtinguiſhed from the Polypodium fragile, with ſome varieties of which it has been confounded.

The inequality of ſize in the upper and lower third leaves, is moſt obvious in the firſt pair; for in ſome of the upper pairs, the triple diviſion


Tab.44.
a
c
b
J. Bolton
a
a

BRITISH MUSEUM NATURAL HISTORY

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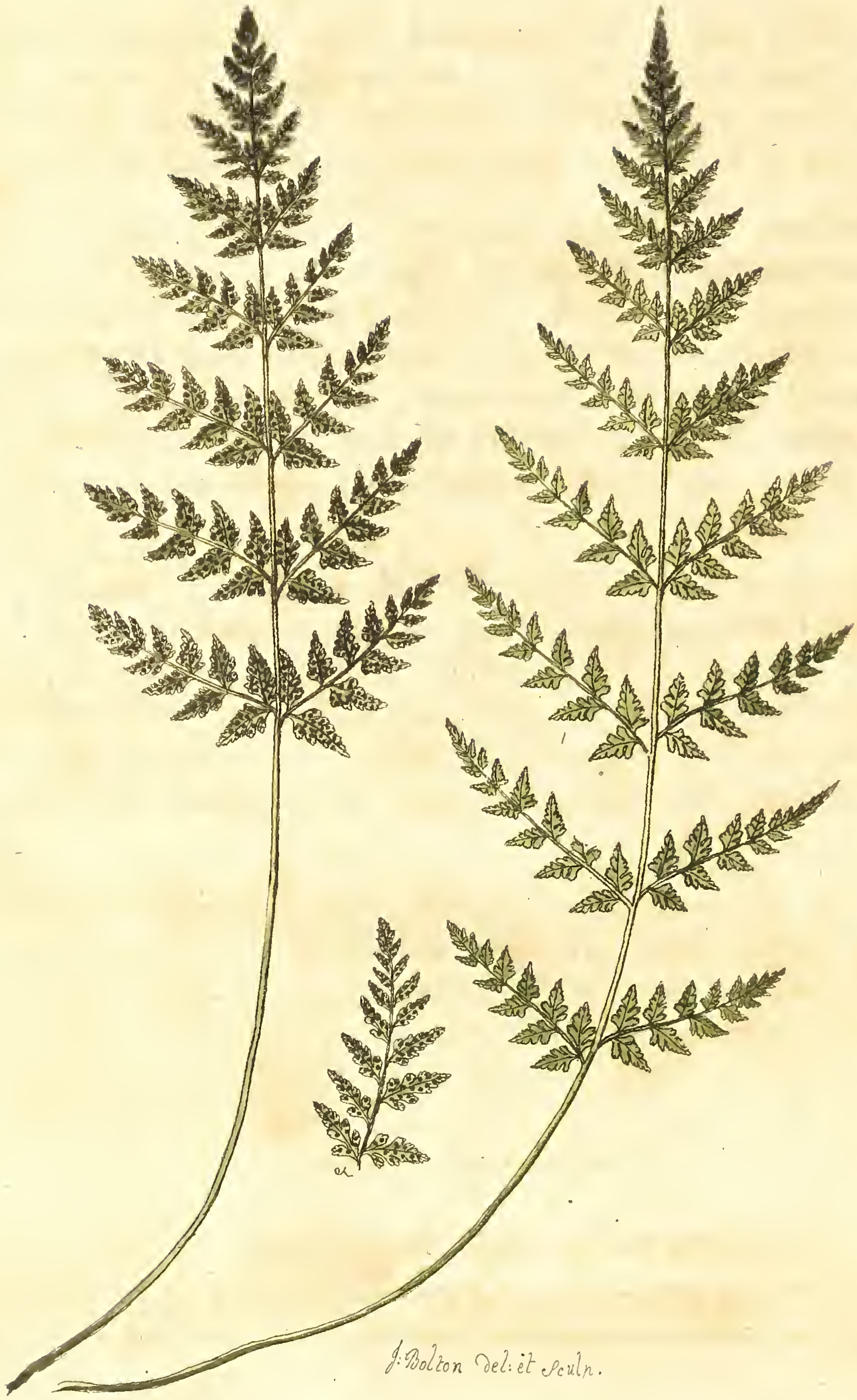
46



J: Bolton del: et Sculp.

viſion ceaſes, and the ſecond leaf terminates in diſtinct, ſharply ſerrated lobes.

The ſeed-veſſels are placed in round dots, on the under ſide of the lobes; two or three on the ſmaller, five or ſix on the larger; they are of a brown colour, and diſtinct. The whole plant is larger, firmer, more robuſt, and of a ſtronger green than the Polypodium fragile.

The Polypodium fragile in ſome of its ſtates, ſee part 1, page 51, ſo nearly reſembles the Polypodium rhœticum, that others, as well as myſelf, have been deceived by it. Hallar, Wais, &c. ſeem to doubt its exiſtence; and it appears from their deſcriptions, that they had not examined the true Polypodium rhœticum; no more had I, otherwiſe ſo obvious a character as the inequality of ſize in the third leaves, on the oppoſite ſides of the rib of the ſecond leaf, could not have been diſregarded.

In my plate of varieties, *Part* 1, *Tab.* 2, thoſe of the Polypodium fragile not being ſufficiently expreſſed, at the inſtance of ſeveral friends, I have added *TAB. XLVI*; in which I have carefully copied theſe varieties. For on the two ſtems given in the plate, by varying the ſecond leaves, as I found them in ſeparate ſpecimens, I have repreſented all thoſe varieties which have been ſuppoſed moſt to reſemble the Polypodium rhœticum.

Specimens of Polypodium rhœticum and Acroſtichum thelypteris were ſent me by my friend Dickſon, author of the *Plantarum Cryptogamicarum Britanniæ*; the firſt he gathered in *Scotland*, the laſt, he informs me, grows in plenty about *Norwich*.

ERRATA IN THE FIRST PART.

INTRODUCTION, p. 6, l. 17, *for* ſupine *r.* prone.—P. 16, l. 3. *r.* Anglica.——*In the* BOOK, p. 5, l. 3. *r.* and when the ſeed's are diſcharged.—P. 40, l. 2, 3, *eraſe* Ger. Em. & Park.—P. 41, l. 1, tab. 22.—P. 41, l. 3, *eraſe* from this, *and the reſt of the ſentence.*—P. 51, l. 15, *eraſe* this is; *and the reſt of the ſentence;—ſame line, after* delicate, *add* tab. 46.—*Throughout the Book, for* Polipodium *r.* Polypodium.

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